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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/705,597

11/10/2003

Anand Anandakumar

JA03-001

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EXAMINER

CHAUDRY, MUJTABA M

ART UNIT

PAPER NUMBER

2112

MAIL DATE

DELIVERY MODE

05/16/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

Application No.

10/705,597

Applicant(s)

ANANDAKUMAR, ANAND

Examiner

Mujtaba K. Chaudry

Art Unit

2112

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 05 March 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-5 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-5 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 March 2007 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- ☐ Notice of Informal Patent Application
- ☐ Other: \_\_\_\_\_

### **DETAILED ACTION**

Applicant's response was received March 05, 2007.

- Drawing objections are withdrawn in light of amendments.
- Claim rejections under 35 USC 103 remain.
- Claim rejections under 35 USC 112 are introduced in light of amendment.
- Claims 1-5 stand rejected.

Application pending.

#### ***Response to Amendment***

Applicant's arguments/amendments with respect to claims 1-5 filed March 05, 2007 have been received. All arguments have been fully considered and are moot in view of new grounds of rejection under 35 USC 112. The Examiner would like to point out that this action is made final (See MPEP 706.07a).

#### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

**Claim 1 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.**

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- For example, claim 1 recites, "...whereby said modulo arithmetic operations **along with a logarithmic domain** obviate a need for additional operations to scale and normalize data." It is not clear what is meant by "logarithmic domain". The only possible interpretation that the Examiner can make is that the modulo operations are performed in log domain. It is clear that the first and second decoders inherently use modulo arithmetic operations to calculate probability estimates. According to the specification, as pointed out by the Applicant, in log domain the multiplication operations change to additions and division to subtraction. If this is the case then, Zeng clearly teaches (i.e., Figure 4) to perform addition and subtraction operations in decoding the data, which implies that the operation is in "log domain". However, it is not clear from the claim how using the modulo operations in log domain eliminate the need to scale and/or normalize data. It seems a though essential limitations relating the modulo operations in log domain functionality are missing from the claim language that would define the meets and bounds of the claim. For the purposes of examination the forgoing limitations are not considered until they are clear. Therefore rejections under 35 USC 103 remain.

Claims 2-5 do not rectify the matter of claim 1 and inherently include the limitations of claim 1 and therefore are rejected as well. Appropriate correction is requested.

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***Claim Rejections - 35 USC § 103***

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35

U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

**Claims 1-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyauchi et al.**

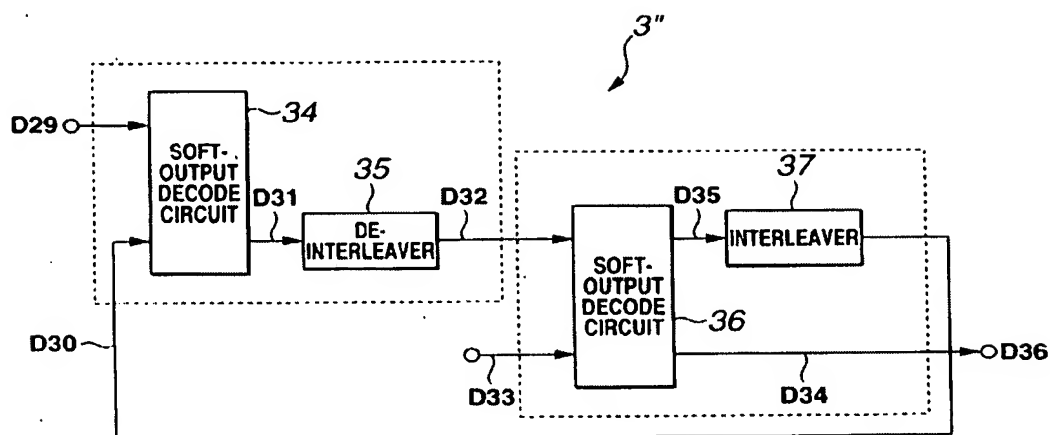
**(herein after: Miyauchi, USPPN 2003/0106011) further in view of Zeng et al. (herein after:**

**Zeng, "Design and Implementation of A Turbo Decoder for 3G W-CDMA System",**

**Published March 11, 2002—Cited in Applicant's IDS). (Previously present<sup>ed</sup> rejection):** (G)

As per claim 1, Miyauchi substantially teaches a decoder for a communication system (i.e., Figure 1), the decoder comprising: a first decoder block (i.e., Figure 9, reference number 34 and paragraph 0280-0281) that receives a soft-input information bit for decoding and calculates a probability estimate for the soft-input information bit; a second decoder block (i.e., Figure 9, reference number 36 and paragraph 0280-0284) configured to receive and process the probability estimate of the soft-input information bit; and a decision module adapted to receive the processed soft-input information and to generate hard-decision output information (i.e., paragraph 0909).

Miyauchi:

**FIG.9**

Miyauchi does not explicitly teach to perform modulo arithmetic operations as stated in the present application.

However, Zeng teaches, in an analogous art, (abstract) the design and implementation of log-MAP turbo decoder used in 3G mobile communication W-CDMA systems. The decoding algorithm is highly data dominated and needs many memories for data storing. Particularly, Zeng teaches (i.e., Figure 1 and Page 285) to use perform branch metric calculations for each of the iterations in the second decoder (Reference 107, Figure 1). The Examiner would like to point out that branch metric calculations inherently require modulo arithmetic operations. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to allow the second decoder of Miyauchi to perform branch metric calculations with arithmetic operations as suggested by Zeng. This modification would have been obvious to one of ordinary skill in the art because one of ordinary skill in the art would have recognized that by performing

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branch metric calculations in the second decoder would have improved the decoding by reducing the overall memory requirements in the decoding process as indicated by Zeng (abstract).

As per claim 2, Miyauchi substantially teaches, in view of above rejections, (i.e., Figure 9 and Paragraph 0281) the first decoder block includes an output element configured to receive the soft-input information bit and to generate extrinsic information.

As per claim 3, Zeng substantially teaches, in view of above rejections, (i.e., Figure 1) an interleaver configured to interleave the received output extrinsic information, and to direct the interleaved output to the second decoder block.

As per claim 4, Zeng substantially teaches, in view of above rejections, (i.e., Figure 1 and Page 285) the second decoder block includes a state metric calculator configured to calculate backward and forward metric using the soft-input information bit and extrinsic information.

As per claim 5, Zeng substantially teaches, in view of above rejections, (i.e., Figure 1) a de-interleaver configured to de-interleave the output of the second decoder block, and to feed the de-interleaved output back to the first decoder block.

***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiries concerning this communication should be directed to the examiner, Mujtaba Chaudry who may be reached at 571-272-3817. The examiner may normally be reached Mon – Thur 6:30 am to 4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jacques Louis-Jacques can be reached on 571-272-6962.




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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Mujtaba Chaudry  
Art Unit 2112  
May 8, 2007



GUY LAMARRE  
PRIMARY EXAMINER